



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/578,192

05/04/2006

Shigeru Hanzawa

127902

8431

25944 7590 10/15/2008

OLIFF & BERRIDGE, PLC

P.O. BOX 320850

ALEXANDRIA, VA 22320-4850

EXAMINER

BERNSTEIN, DANIEL A

ART UNIT

PAPER NUMBER

3743

MAIL DATE

DELIVERY MODE

10/15/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/578,192	<b>Applicant(s)</b> HANZAWA ET AL.	
	<b>Examiner</b> DANIEL A. BERNSTEIN	<b>Art Unit</b> 4166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/04/2006 and 06/21/2006</u> .                               | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2 and 12 recites the limitation "a third heater". There is insufficient antecedent basis for this limitation in the claim. The mention of a third heater in this claim makes it unclear whether the claimed subject matter is directed at a first, second and third heater or to a heater called a third heater.

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 rejected under 35 U.S.C. 102(b) as being anticipated by US 2002/0003322 to Dull et al. (Dull).

Dull teaches:

#### In reference to claims 1 and 2

A furnace comprising a heating unit (combustion burner 26, Fig.2), a furnace body (tunnel kiln 10) that can degrease an article (release of carbonaceous material, [0020]) to be degreased by heating the article with the heating unit ([0035]), and a treatment gas-introducing unit (return delivery system 46), the article being disposed in the furnace body and containing an organic substance (organic or carbonaceous

Art Unit: 4166

material [0011]), wherein the furnace body includes an outlet (exhaust system 42) for discharging a degreasing gas containing a small amount of gaseous oxygen and a large amount of gaseous organic decomposition products generated in an internal section (carbonaceous release region 40) of the furnace body during the degreasing of the article and also includes an inlet (low oxygen gas through the inlet of the combustion air blower supplying the burners [0035]) for receiving a dilution gas, from outside, for reducing the concentration of the gaseous organic decomposition products in the furnace body to prevent the explosion of the gaseous organic decomposition products (dilution gas prevents lower explosive limit from being attained [0020]); the heating unit includes a first heater (combustion burner 26, Fig. 2) that can heat and degrease the article disposed in the furnace body and a second heater (afterburner 44) which heats the degreasing gas (burns partially reacted and unreacted carbonaceous material remaining in exhaust gas [0044]) discharged from the outlet (42) of the furnace body such that the gaseous organic decomposition products are removed ([0044]) and such that the degreasing gas is converted into a treatment gas containing a small amount of gaseous oxygen (treated exhaust gas is then returned back into the kiln carbonaceous release region [0044]); the treatment gas-introducing unit (46) is used to introduce the treatment gas for dilution (dilution effect, low oxygen content gas, [0041]) into the internal section of the furnace body from the second heater (44) through the inlet and/or the first heater (26); and the treatment gas is introduced into the internal section (material release region 12) of the furnace body from the inlet and/or the first heater in such a manner that the treatment gas is circulated through the internal section of the

Art Unit: 4166

furnace body, the outlet, the second heater, the treatment gas-introducing unit, and the inlet and/or the first heater (treatment gas is circulated through 46 and reintroduced into 12), whereby the concentration of the gaseous organic decomposition products in the internal section of the furnace body is reduced such that explosion is prevented (Dull's circulation of low oxygen content gases reduces both the temperature gradient and unwanted combustion of gases thereby reducing cracking [0020]), whereby the concentration of gaseous oxygen in the internal section of the furnace body is maintained low such that the article is prevented from being cracked due to the abnormal combustion of the gaseous organic decomposition products, and whereby the article can be degreased in a short time and then subjected to a subsequent firing step.

For the rejection of claim 2 see the rejection of claim 1 above. Claim 2 recites the same claimed subject matter as above in claim 1. The only discernable difference between claims 1 and 2 is the limitation of a third heater. Also, claim 2 lacks a first and second heater, so the recitation of a third heater has been interpreted as if one heater is being claimed, not a first, second and third heater. Please refer to the 35 USC 112 2nd rejection above. Since the claim language states "a furnace comprising" and claim 2 does not narrow the scope of the claim to contain only one burner, the 102(b) rejection of claim 1 also can be applied to claim 2, with the third heater being substituted for the second.

In reference to claims 3

The furnace according to claim 1, further comprising a low-oxygen content gas-introducing unit (delivery conduit 16 and 26, also see [0035] for low oxygen content) for

Art Unit: 4166

introducing a low-oxygen content gas, different in supply line from the treatment gas (16 is a separate delivery conduit than 46), into the internal section of the furnace body in addition to or instead of the treatment gas-introducing unit.

In reference to claims 4

The furnace according to claim 1, wherein the organic substance contains at least one selected from the group consisting of polyvinyl alcohol, polyethylene glycol, starch, methylcellulose, carboxymethylcellulose, hydroxyethylcellulose, hydroxypropylmethylcellulose, polyethylene oxide, sodium polyacrylate, polyacrylamide, polyvinyl butyral, ethylcellulose, cellulose acetate, polyethylene, an ethylene-vinyl acetate copolymer, polypropylene, polystyrene, an acrylic resin, polyamide, glycerin, polyethylene glycol, and dibutyl phthalate (organic binders and plasticizers and lubricants, mentions at least one, carboxymethylcellulose [0004]).

In reference to claims 5

The furnace according to claim 1, wherein the concentration of gaseous oxygen in the internal section of the furnace body is maintained at 0.5 to 17 volume percent using the treatment gas (page 6 Table IV shows oxygen levels within that range).

In reference to claims 6

The furnace according to claim 1, wherein the first to second heaters are gas burners (combustion burner 26 and afterburner 44 are gas burners).

In reference to claims 7

The furnace according to claim 1, wherein the treatment gas-introducing unit includes a sealed pipe for communicatively connecting the second heater to the furnace

Art Unit: 4166

body (the distribution system of the tunnel kiln comprises a series of independently metered, individually piped delivery conduits [0033]).

In reference to claims 8

The furnace according to claim 1, further comprising a heat-exchanging unit disposed between the second heater and the treatment gas-introducing unit (see heat exchanger Fig. 3).

In reference to claims 10 and 12

A degreasing method comprising a step of degreasing an article to be degreased using a furnace including a heating unit (combustion burner 26, Fig. 2), a furnace body (tunnel kiln 10), and a treatment gas-introducing unit (return delivery system 46) by heating the article ([0035]) with the heating unit and a firing step subsequent to the degreasing step, the article being disposed in an internal section of the furnace body (ceramic material is fired by the tunnel kiln [0032]) and containing an organic substance ([0011]), wherein the furnace body includes an outlet (exhaust system 42) for discharging a degreasing gas containing a small amount of gaseous oxygen and a large amount of gaseous organic decomposition products generated in the internal section (carbonaceous release region 40) of the furnace body during the degreasing of the article and also includes an inlet (low oxygen gas through the inlet of the combustion air blower supplying the burners [0035]) for receiving a dilution gas, from outside, for reducing the concentration of the gaseous organic decomposition products in the furnace body to prevent the explosion of the gaseous organic decomposition products (dilution gas prevents lower explosive limit from being attained [0020]); the heating unit

Art Unit: 4166

includes a first heater (combustion burner 26) that can heat and degrease the article disposed in the furnace body and a second heater (afterburner 44) which heats the degreasing gas (burns partially reacted and unreacted carbonaceous material remaining in exhaust gas [0044]) discharged from the outlet (42) of the furnace body such that the gaseous organic decomposition products are removed ([0044]) and such that the degreasing gas is converted into a treatment gas containing a small amount of gaseous oxygen (treated exhaust gas is then returned back into the kiln carbonaceous release region [0044]); the treatment gas-introducing unit (46) is used to introduce the treatment gas for dilution ([0041]) into the internal section of the furnace body from the second heater (44) through the inlet and/or the first heater (26); and the treatment gas is circulated through the internal section (material release region 12) of the furnace body, the outlet, the second heater, the treatment gas-introducing unit, and the inlet and/or the first heater (treatment gas is circulated through 46 and reintroduced into 12), whereby the concentration of the gaseous organic decomposition products in the internal section of the furnace body is reduced such that explosion is prevented (Dull's circulation of low oxygen content gases reduces both the temperature gradient and unwanted combustion of gases thereby reducing cracking [0020]), whereby the concentration of gaseous oxygen in the internal section of the furnace body is maintained low such that the article is prevented from being cracked due to the abnormal combustion of the gaseous organic decomposition products, and whereby the article can be degreased in a short time and then subjected to the subsequent firing step (carbonaceous release region 100-600 deg C [0032], which is the step before firing).



Claims 10 and 12 are identical except for the mention of a "third heater" in claim 12 as apposed to a "second heater" in claim 10. See USC 112 2nd rejection above. Also see rejection of claims 1 and 2.

In reference to claims 11

The degreasing method according to claim 10, wherein the treatment gas is circulated through the internal section of the furnace body, the outlet, the second heater, the treatment gas-introducing unit, and the inlet without operating the first heater. See Fig. 3 where circulation of the treatment gas does not pass through the first burner 26.

In reference to claims 13

The degreasing method according to claim 10, further comprising a low-oxygen content gas-introducing unit (delivery conduit 16 and 26, also see [0035] for low oxygen content) for introducing a low-oxygen content gas, different in supply line from the treatment gas (16 is a separate delivery conduit than 46), into the internal section of the furnace body in addition to or instead of the treatment gas-introducing unit.

In reference to claims 14

The degreasing method according to claim 10, wherein the organic substance contains at least one selected from the group consisting of polyvinyl alcohol, polyethylene glycol, starch, methylcellulose, carboxymethylcellulose, hydroxyethylcellulose, hydroxypropylmethylcellulose, polyethylene oxide, sodium polyacrylate, polyacrylamide, polyvinyl butyral, ethylcellulose, cellulose acetate, polyethylene, an ethylene-vinyl acetate copolymer, polypropylene, polystyrene, an acrylic resin, polyamide, glycerin, polyethylene glycol, and dibutyl phthalate (organic

Art Unit: 4166

binders and plasticizers and lubricants, mentions at least one, carboxymethylcellulose [0004]).

In reference to claims 15

The degreasing method according to claim 10, wherein the concentration of gaseous oxygen in the internal section of the furnace body is maintained at 0.5 to 17 volume percent using the treatment gas (page 6 Table IV shows oxygen levels within that range).

In reference to claims 16

The degreasing method according to claim 10, wherein the first to second heaters are gas burners (combustion burner 26 and afterburner 44 are gas burners).

In reference to claims 17

The degreasing method according to claim 10, wherein the treatment gas-introducing unit includes a sealed pipe for communicatively connecting the second heater to the furnace body (the distribution system of the tunnel kiln comprises a series of independently metered, individually piped delivery conduits [0033]).

In reference to claims 18

The degreasing method according to claim 10, further comprising a heat-exchanging unit and/or catalyst disposed between the second heater and the treatment gas-introducing unit and/or the low oxygen content gas-introducing unit (see heat exchanger Fig. 3).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 9 and 19 rejected under 35 U.S.C. 103(a) as being unpatentable over Dull.

In reference to claims 9 and 19

Dull discloses the percentage of inorganic and organic compounds in batch 1 and 2 ([0049]) before the article is treated, but he is silent to the percentage of inorganic and organic compounds remaining after the article has been treated.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to treat a ceramic article as disclosed by Dull to achieve a range of inorganic materials remaining in a degreased article to fall within 5% to 60%, for the purpose of preventing cracking in a ceramic specimen during the firing process. Removal of organic and carbonaceous materials is time and temperature dependent. Therefore, it would have been obvious to achieve the range of 5% to 60% through routine experimentation and optimization.

***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 3,619,908, 4,270,898, 6,227,847, 6,485,296 and 7,207,797 are all considered relevant prior art to this examination. Any inquiry concerning this

Art Unit: 4166

communication or earlier communications from the examiner should be directed to DANIEL A. BERNSTEIN whose telephone number is (571)270-5803. The examiner can normally be reached on Monday-Friday 8:00 AM - 5:00 PM EDT.

6. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Bomberg can be reached on 571-272-4922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

7. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DAB

/Kenneth B Rinehart/  
Supervisory Patent Examiner, Art Unit 3743